Opportunity Title: EPA Fellowship in Advancing Software and Modeling Tools for Smart Stormwater and Sewer Systems for Small to Medium-Sized Communities
Opportunity Reference Code: EPA-ORD-CESER-BIL-2024-10

Organization	U.S. Environmental Protection Agency (EPA)
Reference Code	EPA-ORD-CESER-BIL-2024-10
How to Apply	***Connect with ORISE...on the GO!*** Download the new ORISE GO mobile app in the Apple App Store or Google Play Store to help you stay engaged, connected, and informed during your ORISE experience and beyond!

A complete application consists of:

- An application
- Transcript(s) – For this opportunity, an unofficial transcript or copy of the student academic records printed by the applicant or by academic advisors from internal institution systems may be submitted. All transcripts must be in English or include an official English translation. Click here for detailed information about acceptable transcripts.
- A current resume/CV, including academic history, employment history, relevant experiences, and publication list
- Two educational or professional recommendations. Click here for detailed information about recommendations.

All documents must be in English or include an official English translation.

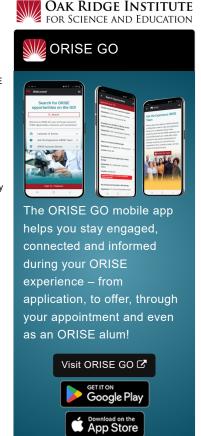|	
Application Deadline	2/14/2025 3:00:00 PM Eastern Time Zone
Description	***Applications may be reviewed on a rolling-basis and this posting could close before the deadline.** Click **here** for information about the selection process.

EPA Office/Lab and Location: A research opportunity is currently available at the Environmental Protection Agency (EPA), Office of Research and Development (ORD), Center for Environmental Solutions and Emergency Response (CESER) located in Cincinnati, Ohio. If selected for the opportunity, the participant will need to relocate to the appropriate EPA facility. The relocation costs are not reimbursable. The opportunity is not 100% remote, but limited remote participation may be considered at the mentor's discretion.

Research Project: The nation's aging wastewater and stormwater infrastructure systems are increasingly facing many challenges including an uncertain climate future, affordability crisis, and emerging contaminants especially in smaller communities. These issues are stressing collection and conveyance systems producing more frequent system failures, including overflows, and are placing technical challenges and additional public health and quality of life burdens on these often-disadvantaged communities. The resiliency of these systems, and the ability to effectively monitor and manage them during and after significant wet weather events, can be enhanced.

Decades ago, EPA developed the Storm Water Management Model (SWMM) and continues to upgrade and support the software. SWMM models can be used for engineering planning and design and, along with relatively inexpensive remote sensing/transmitting devices, are increasingly being used to establish "digital twins" of existing systems to allow for improved monitoring, operations, and maintenance towards more resilient collection systems.

Under the guidance of a mentor, research participant activities may include:

- Advancing SWMM related tools to lower the barrier to developing digital twins of collection systems.
- Identifying critical publicly and freely available remotely sensed or model derived datasets that can be assimilated to improve predictive accuracy of digital twins of collection systems.
- Investigating novel real time control algorithms for developing decision support systems for collection system operators.
- Exploring novel approaches to combine traditional physics/process-based hydrological and hydraulic models and artificial intelligence/machine learning approaches for improved computational performance and accuracy.
- Presenting research at professional conferences.
- Publishing research results in peer-reviewed journals.
- Traveling to professional conferences, research facilities, and field sites.

Learning Objectives: Under the guidance of the mentor, learning objectives include:

- Learning to develop and apply high resolution and fidelity computational hydraulics and hydrology code for real time modeling applications.
- Learning how to develop tools and workflows to automate, simplify, and ultimately reduce the barrier towards setting up digital twins of collection systems for undeserved communities.
- Learning how to develop and deploy artificial intelligence and machine learning models using standard machine learning operation practices to improve the accuracy of predictive models of collections, inform optimal operations, and inform curation and quality control of real time sensor data streams.
- Learning how to deploy sensor and IOT devices and configure networks for transmitting data from these devices.

Mentor(s): The mentor for this opportunity is Caleb Buahin (buahin.caleb@epa.gov). If you have questions about the nature of the research, please contact the mentor.

Anticipated Appointment Start Date: November 25, 2024. All start dates are flexible and vary depending on numerous factors. Click **here** for detailed information about start dates.

Appointment Length: The appointment will initially be for one year and may be renewed three to four additional years upon EPA recommendation and subject to availability of funding.

Level of Participation: The appointment is full-time.

Participant Stipend: The participant will receive a monthly stipend commensurate with educational level and experience. Click **here** for detailed information about full-time stipends.

EPA Security Clearance: Completion of a successful background investigation by the Office of Personnel Management (OPM) is required for an applicant to be on-boarded at EPA.

ORISE Information: This program, administered by ORAU through its contract with the U.S. Department of Energy (DOE) to manage the Oak Ridge Institute for Science and Education (ORISE), was established through an interagency agreement between DOE and EPA. Participants do not become employees of EPA, DOE or the program administrator, and there are no employment-related benefits. Proof of health insurance is

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required for participation in this program. Health insurance can be obtained through ORISE.

ORISE offers all ORISE EPA graduate students and Postdocs a free 5 year membership to the National Postdoctoral Association (NPA).

The successful applicant(s) will be required to comply with Environmental, Safety and Health (ES&H) requirements of the hosting facility, including but not limited to, COVID-19 requirements (e.g. facial covering, physical distancing, testing, vaccination).

Questions: Please see the FAQ section of our website. After reading, if you have additional questions about the application process please email ORISE.EPA.ORD@orau.org and include the reference code for this opportunity.

Qualifications

The qualified candidate should have received a doctoral degree in one of the relevant fields or be currently pursuing with degree completion before the appointment start date. Degree must have been received within the past three years.

Preferred Skills:

- Computer programming using languages including C/C++, python, Fortran, C#, etc.
- Familiarity with various GIS software (e.g., QGIS, ArcGIS Pro, etc.); vector and raster data formats; and application programming interfaces and packages (GDAL, geopandas, etc.)
- Familiarity in configuring and deploying IOT devices.
- Experience in developing and applying artificial intelligence and machine learning for water systems applications.
- Familiarity various artificial intelligence and machine learning frameworks including (scikit-learn, pytorch, Tensorflow, JAX, etc.)

Eligibility Requirements

- **Citizenship:** LPR or U.S. Citizen
- **Degree:** Doctoral Degree received within the last 36 months or currently pursuing.
- **Discipline(s):**
  - **Chemistry and Materials Sciences** (1 👁)
  - **Computer, Information, and Data Sciences** (17 👁)
  - **Earth and Geosciences** (21 👁)
  - **Engineering** (27 👁)
  - **Environmental and Marine Sciences** (5 👁)
  - **Mathematics and Statistics** (11 👁)

Affirmation

I am a U.S. citizen, or I have lived in the United States for at least 36 out of the past 60 months. (36 months do not have to be consecutive.)